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# Influence of feed contaminated with seeds of cleavers (*Galium aparine*) on the health and production traits in broiler chickens

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## Abstract

Clinical observations and gross pathological studies have been performed in field cases in order to determine the effect of cleavers (*Galium aparine)* seeds upon the productive traits and the health of broiler chickens. A negative impact upon productive traits (feedconversion ratio, growth rates and equalization) has been observed. The results of our studies allowed assuming that the health of broiler chickens was influenced by the mechanical ileus due to deposition and accumulation of weed seeds in the gastrointestinal tract of chickens.

**Key words:** *Galium aparine*; cleavers, broiler chickens, clinical and gross pathological studies

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## Introduction

During the last decade in Bulgaria, the episodes of weed seeds called “snake eye” detected in the alimentary tract of fattening chickens and growing birds are increasing. Their origin and presence are interpreted and discussed in various ways. The aim of the present study was to present the data from investigations performed in order to identify the weed and to determine its effect upon the productive traits and the health of broiler chickens.

*Galium aparine*, sticky Willy or cleavers, is an herbal plant belonging to the *Galium* genus. The aerial parts of most plants from this genus contain glycosides, tannins, saponins, coloring substances, coumarin and its derivatives. *Galium aparine* is an annual weed in cereals and earthed-up crops. Its wide distribution was probably due to the broad seed dissemination. The root is thin with multiple hair-like branches. The stem is reclining to ascending, 30-120 cm long, sometimes to 180 cm. It is quadrangular, rugged and sticky, with hooked prickles, hollow, short and hairy in the joints. The leaves are cuneiform, narrowed in the base and mucronate. They are in whorls of 6-8, 20-50 mm long, 3-6 mm broad, covered by strigillose to retrorse prickles (Fig. 1). The flowers are elongated, up to ¾ of stem length. The seeds (fruit) are dry, round or kidney-shaped, with smooth, corrugated or granular surface, sometimes covered with hooked prickles, brown or grey color and are notched on one side (Fig. 2). Both the plant and seeds are relatively resistant to herbicides According to some authors; the germ nativity of seeds is not affected during feed digestion or during their passage through the gut (Cermakova, 1988). In an experiment of ours however, the planting of seeds obtained from the gizzard resulted in no germination. We did the identification of the plant on the basis of its botanical features, after separation of seeds from contaminated feed and planting under artificial conditions.

After getting into the avian gut with feed, the seeds are set down and accumulated in the gizzard. Then their coats are destroyed and drop under the influence of mechanical and chemical factors. In a trial of ours with placement of *Galium aparine* seeds in artificial gastric juice, the seed coat is destroyed after 72–96 hours. They become white with a contrasting black-colored unipolar groove. The seeds detected in the gizzard of chickens are in the same state (Fig. 3). In this condition seeds appeared as an eye and most probably, that is why they are called “snake eye”, a term that became very popular during the last years.

The effect of *Galium aparine* seeds on production traits (feed conversion ratio, weight gain and equalization) in broiler chickens is apparently negative. Table 1 presents the performance traits of six broiler flocks, in whose ration the content of Galium aparine seeds was <1.5% in 3 flocks, and over that level in the other 3 flocks.

According to the experimental data of Koreleski *et al.* (2004), the amount of seeds in broiler feed must not be more than 1.33% in the first and more that 2.7% in the second stage of the fattening period. Cermakova (1988) concluded that the feed in small chickens should be entirely free of weed seeds because a high mortality in 1-week old chickens was observed in a case with 0.75% contamination. The feed conversion ration was also increased. According to our observations, the primary cause for these problems was the occurring mechanical blockage. The continuous accumulation of seeds in the gizzard results in obstruction and according to some authors – to intestinal atony (Januszewski *et al*., 1988). Soon in such chickens, dehydration, lying down and sometimes death are observed.

There are various opinions as to the effect of *Galium aparine* seeds on chicken health. The results of some investigations, including ours, pointed out that chicken health is influenced by the occurring mechanical obstruction (Fig. 4) (Januszewski *et al*., 1988; Koncicki et al., 1989; Jonaitis et al., Musielak, 1991; Mazurkiewich et al., 1991; Salyi et al.,

1991). Others emphasized the direct toxic effect of *Galium aparine* (primarily hepato- and nephrotoxic) due to the release of toxic glycosides and other toxic substances from seeds (Prigli, 1990; Sebekova & Skardova, 2000). Borzemska et al. (1991) reported about the perceptible embryotoxicity of *Galium aparine*. After inoculation of 6-day chick embryos in a solution containing 8.7 mg *Galium aparine* seeds in 0.2 ml PBS per embryo, a decreased hatchability by 6% and a lower average live weight of dead embryos by 18% vs. controls as well as some malformations were detected.

Although *Galium aparine* is relatively resistant to herbicides, its occurrence is particularly related to regions with poor agricultural practice. Its separation from cereals is important for the reduction of its content in feed.

| comparison flocks | Growing period (days) | | Body weight gain (kg) | | Feed conversion rate | | mortality % | |
|---|---|---|---|---|---|---|---|---|
| | <1.5% | >1.5% | <1.5% | >1.5% | <1.5% | >1.5% | <1.5% | >1.5% |
| 1/2 | 39 | 45 | 2.119 | 1.952 | 1.799 | 1.905 | 3.39 | 3.19 |
| 3/4 | 36 | 45 | 1.949 | 1.941 | 1.831 | 1.922 | 3.12 | 2.96 |
| 5/6 | 38 | 45 | 1.923 | 1.749 | 1.789 | 1.980 | 3.03 | 4.2 |

**Table 1. Comparison of performance traits of six broiler flocks, in whose ration the content of Galium aparine seeds was <1.5% in 3 flocks, and over that level in the other 3 flocks.**



**Figure 1.Stem of cleavers (*Galium aparine*).**



**Figure 2. Seeds of *Galium aparine* -seed with envelope (left), seed without envelope (right).**



**Figure 3. Accumulation and retention of *Galium aparine* seeds in the gizzard of a broiler chicken.**

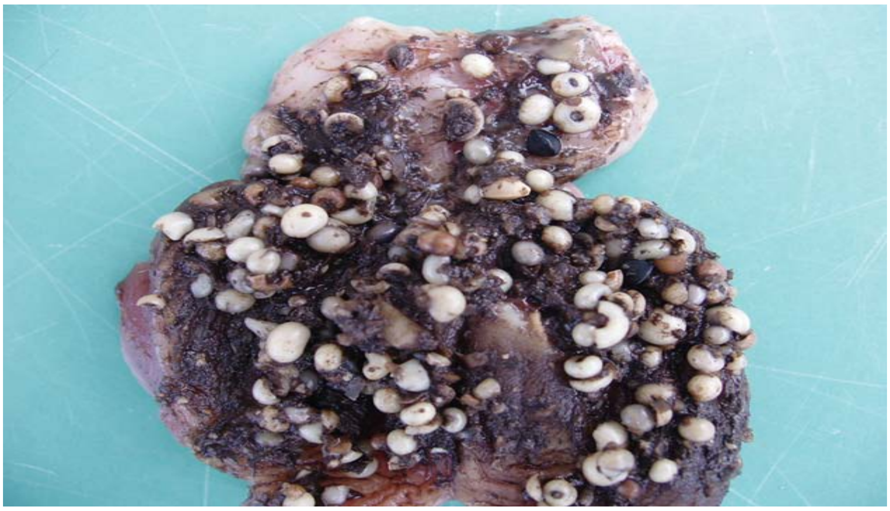


**Figure 4. Putrefactive-necrotic processes in the gizzard of broiler chick, following obstruction, caused by gathering of *Galium aparine* seeds.**

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# تاثیر غذای آلوده به دانه گیاه بلسکی (گالیوم آپارین) روی صفات تولید مثلی و سلامت جوجه های گوشتی

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## چکیده

مشاهدات بالینی و مطالعات آسیب شناختی وسیعی به منظور تعیین اثر دانه های گیاه بلسکی (Galium aparine) بر روی صفات تولید مثلی و سلامت جوجه های گوشتی انجام شده و یک تاثیر منفی بر روی صفات تولید مثلی مشاهده شده است. (نسبت تغییرات تغذیه، میزان رشد و برابری). نتایج تحقیقات، اجازه زدن این حدس را که سلامت جوجه های گوشتی تحت تاثیر انسداد مکانیکی رودوی به علت رسوب و تجمع دانه های علف های هرز در مسیر گوارشی جوجه ها است را به ما داد.

**واژگان کلیدی:** گالیوم آپارین، جوجه های گوشتی، مطالعات بالینی و آسیب شناسی ظاهری